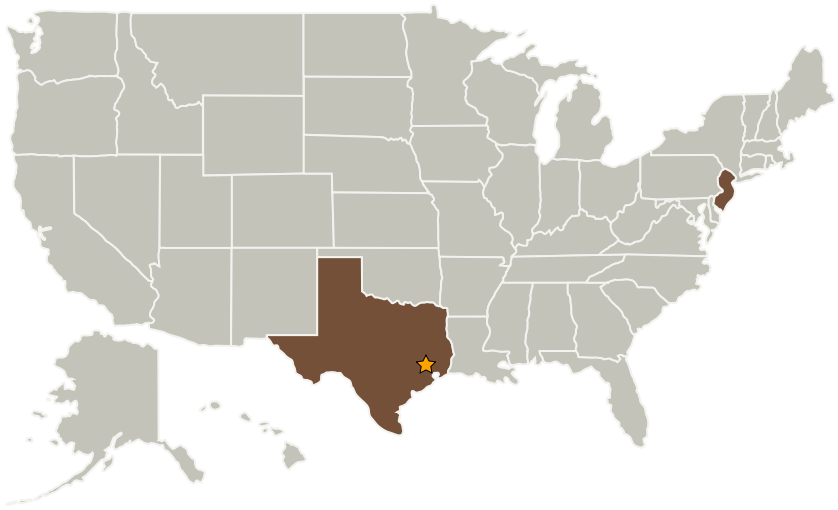
Architectures/Algorithms/Tools for Ultra-Low Power, Compact EVA Digital Radio, Phase I

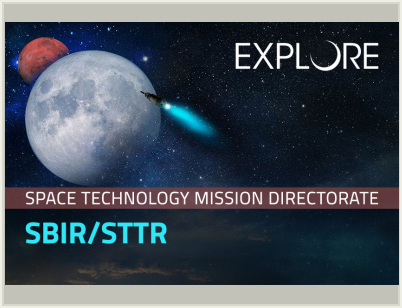
Completed Technology Project (2009 - 2009)

Project Introduction

The EVA digital radio imposes tight constraints on power consumption, latency, throughput, form factor, reconfigurability, single event upset and fault tolerance, and security. This requires a complete rethink on the digital radio architecture. We propose such an architecture called CHANDRA that exploits a cycle-by-cycle reconfigurable FPGA that is based on state-of-the-art double-gate CMOS and nano RAM technology. In order to make the FPGA, and hence CHANDRA, ultra-low power, we will investigate various FinFET implementations, 3D architectures, and dynamic power/QoS management techniques. This will be aided by the presence of nano RAMs, such as NRAMS, MRAMs, PCMs and embedded DRAMS, for on-chip configuration and data storage. The FPGA will be implemented with the currently used chip fabrication technology: photo-lithography. We propose to map novel non-GPS relative location-aware algorithm based on a hybrid distributed localization concept, multimode protocol functioning for voice (VoIP), video, data transmission, and run digital radio applications starting from the simulation level to relevant environment demonstration towards providing the miniaturized EVA Digital Radio.

Primary U.S. Work Locations and Key Partners





Architectures/Algorithms/Tools for Ultra-Low Power, Compact EVA Digital Radio, Phase I

Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

Architectures/Algorithms/Tools for Ultra-Low Power, Compact EVA Digital Radio, Phase I

Completed Technology Project (2009 - 2009)

Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
UniRF Technologies, Inc.	Supporting Organization	Industry	Skillman, New Jersey

Primary U.S. Work Locations	
New Jersey	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.1 Situational and Self Awareness
    - TX10.1.3 Knowledge and Model Building